

INNOVATION SCIENCE AND TECHNOLOGY

ISSUE 5



Acceptance of papers **May, 2026**



**Acceptance of
papers**

Published monthly



Topics

economics,
technology, social
sciences



EDITOR-IN-CHIEF:

Mirzaliyev Sanjar Makhmatjon ugli

DEPUTY EDITOR-IN-CHIEF:

Makhmudov Nosir Makhmudovich
DSc., Prof., Academician

DEPUTY EDITOR-IN-CHIEF:

Ochilov Bobur Bakhtiyor ugli – Senior
lecturer at TSUI

THE SCIENTIFIC-POPULAR ELECTRONIC
JOURNAL **"INNOVATION SCIENCE AND
TECHNOLOGY"** HAS BEEN REGISTERED
UNDER THE NUMBER **C-5669633** BY THE
AGENCY FOR INFORMATION AND MASS
COMMUNICATIONS (AOKA) OF THE
REPUBLIC OF UZBEKISTAN, EFFECTIVE
FROM OCTOBER 9, 2024.

CONTACTS

Phone: **+998 50 737 87 88**

Website: <https://ist-journal.uz>

Email: innovationist2025@gmail.com

The scientific electronic journal "Innovation Science and Technology" has been included in the list of scientific publications recommended for the publication of main scientific results of dissertations for the award of PhD and DSc degrees in economics and technical sciences, in accordance with the Resolution No. 370 of the Presidium of the Higher Attestation Commission of the Republic of Uzbekistan, dated May 8, 2025.

Editorial board:



Sharipov Kongiratbay Avezimbetovich,
Doctor of Technical Sciences (DSc), Professor



Abdurakhmanova Gulnora Kalandarovna, Doctor of
Economic Sciences (DSc), Professor



Cham Tat Huei,
Doctor of Philosophy (PhD), Professor (Malaysia)



Muhammad Imran Sadiq
Doctor of Philosophy in Economics (PhD), Professor,
Malaysia



Ahmed Aziz Ismail
Doctor of Technical Sciences (DSc),
Professor (Egypt)



Lee Chin
Doctor of Philosophy in Economics (PhD), (Malaysia)



Asongu Simplice
Doctor of Philosophy in Economics (PhD), Cameroon



Rui Dang
Doctor of Chemistry (DSc), Professor, China



Zahoor Ahmed
Doctor of Philosophy in Economics (PhD), Turkey



Shujaat Abbas
Doctor of Philosophy in Economics (PhD), Russia



Tina A Coffelt
Doctor of Philosophy in Educational Sciences (PhD),
USA



Abdikarimova Dinara Rustamxanovna
Doctor of Economic Sciences (DSc), Professor

Kurbonbekova Mohichehra Turobjonovna
Doctor of Economic Sciences (DSc), Professor

Alimardonov Ilkhom Muzrabshokovich
Doctor of Economic Sciences (DSc), Professor



Razakova Barno Sayfieva
Doctor of Philosophy in Economics (PhD)



Khasanov Sarvar Ulugbek ugli
Doctor of Philosophy in Economics (PhD)



Kholikova Rukhsora Sanjarovna
Associate Professor (PhD)

CONTENTS

MECHANISMS FOR FORMING AND IMPLEMENTING INVESTMENT POLICY OF COMMERCIAL BANKS... 8 Abduvaliyev Sanjar Abdurahmanovich	8
EVALUATION OF MANAGEMENT EFFICIENCY BASED ON BUDGETING IN ENERGY ENTERPRISES (A FACTOR ANALYSIS CASE OF "HUDUDGAZTA'MINOT" JSC)..... 17 Sobirov Shoyadbek Kurbonaliyevich	17
PORTFOLIO OF POSTAL SERVICES AND THE ECONOMIC EFFICIENCY OF ITS DIGITALIZATION23 Mamatkulov Gulom Rustamovich	23
OPTIMIZING THE BALANCE BETWEEN LIQUIDITY AND CREDIT RISKS IN ENSURING BANKING STABILITY30 Anvarov Asliddin Nabijon ugli	30
ECONOMIC EFFICIENCY OF RENEWABLE ENERGY DEPLOYMENT IN UZBEKISTAN.....34 Hamroyeva Sabina Ismoil qizi, Dilshod Anvarjonovich Ismailov	34
MODERN TRENDS AND EFFICIENCY OF LENDING TO AGRICULTURAL PRODUCERS IN UZBEKISTAN..39 Shamshetova Gulraushan Sarsenovna	39
ANALYSIS OF THE RELATIONSHIP BETWEEN YOUTH EMPLOYMENT AND CRIME (CASE OF UZBEKISTAN)42 Khusniddinova Gulnoza	42
PRIORITY DIRECTIONS FOR IMPROVING THE INFRASTRUCTURE OF UZBEKISTAN'S FINANCIAL SYSTEM47 Qobilova Nodira Qayumjon qizi, Normurodov Kh.E.	47
FOREIGN EXPERIENCE OF INCREASING THE EXPORT CAPACITY OF THE REGION AND SPECIFIC FEATURES OF ITS APPLICATION IN UZBEKISTAN52 Mamadzhanova Tuygunoy Akhmadzhanovna	52
INSTITUTIONAL APPROACH TO WASTE MANAGEMENT AND ITS ECONOMIC EFFICIENCY56 Otbosarov Abrorbek Adhamjon o'g'li	56
LOSS MANAGEMENT MATRIX (LOSS MANAGEMENT MATRIX) MODEL IN POWER GRID ENTERPRISES..61 Khojimurodov Zukhriddin Shukurullo oglu	61
MICROPROJECTS AS A MEANS OF INCREASING THE FINANCIAL ACTIVITY AND LITERACY OF THE POPULATION67 Irgashev Anvar Farxodovich	67
INSTITUTIONAL VA TEXNOLOGIK O'ZGARISHLAR SHAROITIDA INNOVATION BANK XIZMATLARINI JORIY ETISH METODOLOGIYASINI TAKOMILLASHTIRISH.....74 Azlarova Aziza Axrorovna	74
PROBLEMS OF FORMATION AND DEVELOPMENT OF REGIONAL CLUSTERS IN THE LIGHT INDUSTRY OF UZBEKISTAN80 Umarkulov Kodirjon Maxamadaminovich	80
DIGITAL FINANCIAL INCLUSION AS A DRIVER OF SUSTAINABLE DEVELOPMENT: EVIDENCE FROM GLOBAL TRENDS AND IMPLICATIONS FOR EMERGING ECONOMIES.....84 Sabitov Oybek Abduganievich, Sattoriy Fayzullokh Abdijabbor ugli	84
PROPERTIES OF HEAVY CONCRETE DISPERSEDLY REINFORCED WITH NON-METALLIC FIBERS AND SPECIFIC FEATURES OF CALCULATING CONCRETE STRUCTURES BASED ON THEM90 Usmonova Durdona, Gulomova Dilnura	90
THE EFFECT OF STABLE AND DYNAMIC PRICING ON CONSUMER BEHAVIOR98 Anvar DEBERDIYEV	98
ECONOMIC MECHANISMS FOR IMPROVING PRODUCTION EFFICIENCY IN INDUSTRIAL ENTERPRISES..102 M.O. Yo'ldoshova	102

PEDAGOGICAL EFFECTIVENESS OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN TEACHING POLITICAL SCIENCE AT HIGHER EDUCATION INSTITUTIONS	106
Rasulev Bobirjon Atkhamovich	
IMPROVING THE ORGANIZATIONAL AND ECONOMIC MECHANISM FOR REGULATING NON-STANDARD EMPLOYMENT IN THE DEVELOPMENT OF SMALL BUSINESSES	110
Fayzullayev Nurulla Bakhromovich	
PRIORITIES FOR IMPROVING THE HEALTHCARE FINANCING SYSTEM IN UZBEKISTAN	117
Gulira'no Atabekovna Ruzmetova	
FACTORS AFFECTING TAX PAYMENT SYSTEMS, EXISTING PROBLEMS, AND THEIR CAUSES	124
Tangirqulov Gulom Baxtiyorovich	
EFFECTIVENESS OF ENVIRONMENTAL TAXES IN REDUCING CARBON EMISSIONS IN UZBEKISTAN: AN ECONOMETRIC APPROACH.....	129
Kuziboev Bekhzod Hamidovich	
WAYS TO DEVELOP QUALITY MANAGEMENT IN THE SILK INDUSTRY OF UZBEKISTAN'S ECONOMY	134
Bahriddinov Asror Rakhmatovich, Boltaev Nazarbek Narzullaevich	
STATE OF LENDING TO SMALL BUSINESS PROJECTS IN COMMERCIAL BANKS AND ITS ECONOMIC- STATISTICAL ANALYSIS.....	138
Nargiza Norqobilova Abdiqodirovna	
CONCEPTUAL DIRECTIONS FOR IMPROVING THE MECHANISMS OF ENSURING FINANCIAL STABILITY IN ENTERPRISES.....	143
Asomidinova Mohigulbonu Oybek kizi	
ORGANIZATION OF MANAGEMENT ACCOUNTING IN NON-STATE HIGHER EDUCATION INSTITUTIONS	148
Xojiboyev Muxiddin Shodimuxamedovich	
THE NATURE AND ESSENCE OF DIGITAL TRANSFORMATION PROCESSES IN MASS MEDIA ORGANIZATIONS.....	151
Sharipova Shahlo Istamovna	
COMPARATIVE ANALYSIS AND EXPERIMENTAL EVALUATION OF ALGORITHMS FOR RECOVERING MISSING (NAN) VALUES IN INFORMATION SYSTEM DATA	156
Yarmatov Sherzodjon Shokir oğlu, Orifov Oxunjon Fazliddinzoda	
ANALYSIS OF THE STATE OF MARKETING MANAGEMENT IN MANUFACTURING ENTERPRISES	167
Musayeva Shoirazimovna	
IMPROVING LOAN PORTFOLIO QUALITY AND CREDIT RISK MANAGEMENT MECHANISMS	173
Turgunov Nodirbek Muminjanovich	
INNOVATION CAPABILITIES AND EXPORT PERFORMANCE: THE MEDIATING ROLES OF SUPPLY CHAIN INNOVATION AND ENTREPRENEURIAL ORIENTATION — EVIDENCE FROM UZBEKISTAN	177
Mukhammadyaminova Shakhzoda	
URBAN PLANNING OF TRANSPORT INTERCHANGE HUBS NEAR TUBERCULOSIS CARE FACILITIES IN UZBEKISTAN	183
Gabibova Irina Vagifovna, Abdumuminova Diyora Gayratovna	
ADAPTING INTERNAL AUDIT STANDARDS IN BUDGET ORGANIZATIONS TO PUBLIC PROCUREMENT PRACTICES.....	192
Meliboyev Askar Eshmuratovich	
ECONOMETRIC EVALUATION OF INVESTMENT EFFICIENCY IN KHOREZM REGION	197
Otajonov Umid Abdullayevich	
SCIENTIFIC AND PRACTICAL SIGNIFICANCE OF MODERN RECLAMATION AND GIS TECHNOLOGIES ON SALINE SOILS IN KARAKALPAKSTAN	205
Tajibaev Berdakh	
ISSUES REGARDING THE IMPLEMENTATION OF THE “TOLLING OPERATIONS” MODULE IN THE GOODS MOVEMENT MANAGEMENT SYSTEM UNDER THE CUSTOMS TERRITORY PROCESSING REGIME	212
Lutpullaev Shukrullo Kudratullaevich	

THE ROLE OF DIGITAL MARKETING IN ENHANCING TOURISM-RELATED BUSINESSES IN UZBEKISTAN Akmaljon Odilov	218
INTERNATIONAL TRENDS OF DIGITALIZATION IN CUSTOMS MANAGEMENT Radjapova Latofat Sardarovna	222
THE ROLE OF TAX POLICY IN THE TRANSITION TO A GREEN ECONOMY Dexkanova Shodiyona Kaxramon qizi	230
PRACTICES IN ENTERPRISE COST STRUCTURE MANAGEMENT AND DIRECTIONS FOR IMPROVEMENT Aymukhammedova Amina Kakajanovna	236
IMPROVING THE ECONOMIC EFFICIENCY OF CLOTHING MANUFACTURING ENTERPRISES IN UZBEKISTAN THROUGH DIGITAL TRANSFORMATION Axmedova Gaziza Azim kizi	242
RECONCEPTUALIZING BUSINESS INCUBATORS IN STARTUP ECOSYSTEMS: THEORETICAL FOUNDATIONS AND INSTITUTIONAL MECHANISMS Gafujon Usmanov	246
DEVELOPMENT OF MODERN MARKETING APPROACHES TO CUSTOMER RELATIONSHIP MANAGEMENT IN RETAIL ENTERPRISES Safarov Bakhtiyor Djurakulovich	257
MECHANISMS FOR EVALUATING AND IMPROVING THE EFFECTIVENESS OF MARKETING STRATEGIES IN THE PUBLIC TRANSPORT SECTOR Berdiyrov Temur Azamatovich	263
THE INFLUENCE OF HYDRODYNAMIC ASPECTS OF GROUNDWATER LEVEL RISE ON URBAN WATERLOGGING B.D. Abdullaev, B.R. Nasibov, Sh.T. Irgashev, D. Abdullaev	268
BASIC INFORMATION MODEL OF A DIGITAL OBJECT Gulyamov Shukhrat Mannapovich, Karakhanova Alsu Muratalievna, Keldiyorov Sirojiddin Tura ugli, Zayniddinova Zebiniso Akmalovna	277
COMPARATIVE LIFE CYCLE AND TECHNO-ECONOMIC ANALYSIS OF SOLAR PANEL MATERIALS FOR SUSTAINABLE PHOTOVOLTAIC SYSTEMS Urishev Omadjon, Kushakova Sarvinoz, Kamolboyev Sirojbek	281
PRIORITY DIRECTIONS FOR FORMING ECOLOGICALLY ORIENTED MANAGEMENT IN CONSTRUCTION INDUSTRY ENTERPRISES Kholov Hamza Tajiddinovich	294
INVESTIGATION OF GERMANIUM EXTRACTION TECHNOLOGY FROM TECHNOGENIC METALLURGICAL WASTE Yormatov Dostonbek, Shodiyev Abbos, Muhammadiyev Elbek	301
MECHANISMS FOR IMPROVING RESOURCE EFFICIENCY AND OPTIMIZING PRODUCTION COSTS IN THE CONSTRUCTION MATERIALS INDUSTRY Utbasarov Doniyorjon Bakhtiyarovich	309
THEORETICAL, PRACTICAL AND METHODOLOGICAL PROBLEMS OF AUDITING THE ACTIVITIES OF ECONOMIC ENTITIES ON THE BASIS OF INTERNATIONAL STANDARDS Mirzaeva Sabina Khushnudovna, Khaydarova Dildora Djakhongirovna	318
THE IMPACT OF DIGITAL AND INNOVATIVE TECHNOLOGIES ON WOMEN'S LABOR IN INDUSTRIAL ENTERPRISES OF UZBEKISTAN UNDER INDUSTRY 4.0 Doniyorova Zukhrabonu Alisher qizi	322
LEVEL OF ENSURING FOOD SECURITY: IMPLEMENTATION MECHANISMS AND INSTRUMENTS Sodiqjon Qodirovich Mattiyev	328
DIGITAL TRANSFORMATION, ECONOMIC EFFICIENCY, AND LOCALIZATION POLICY OF THE PUBLIC PROCUREMENT SYSTEM Turabov Sarvar Abdumalikovich	334
TA'LIM XIZMATLARI BOZORIDAGI INNOVATSIYALAR IQTISODIY XAVFSIZLIKNI TA'MINLASH VOSITASIDA Bozorova Madina Raxmat qizi	339

PROJECT-ORIENTED ESP32 IOT CURRICULUM WITH A SHARED-RESOURCE LABORATORY MODEL: DESIGN, IMPLEMENTATION, AND LESSONS LEARNED	344
Ulugbek Tursunaliyev, Lazizbek Yusupov	
FIVE-CRITERION METHODOLOGY OF INTERNAL CONTROL ENVIRONMENT ASSESSMENT IN TEXTILE INDUSTRY ENTERPRISES	353
Babakulova Matluba Kurbannazarovna	
THE EFFICIENCY OF EDUCATION-INDUSTRY INTEGRATION IN THE CONTEXT OF THE KNOWLEDGE ECONOMY.....	357
Uzaydullayev Sherzod Shukurullayevich	
MECHANISMS AND DIRECTIONS FOR DEEPENING REGIONAL INTEGRATION PROCESSES IN CENTRAL ASIA.....	361
Akbarova Kamola Akmaljonovna	
EVALUATION OF THE EFFECTIVENESS OF MANAGEMENT SYSTEMS IN HEALTHCARE INSTITUTIONS	368
Saidov Suhrob Shodmonovich	
IMPROVING INVESTMENT ATTRACTION MECHANISMS IN UZBEKISTAN'S SERVICE SECTOR: BARRIERS, OPPORTUNITIES, AND POLICY RECOMMENDATIONS.....	371
Shermatov Axror Abdixakimovich	
METHODOLOGICAL FOUNDATIONS FOR FORMING CUSTOMS RISK PROFILE INDICATORS BASED ON MATHEMATICAL AND STATISTICAL METHODS	377
Niyazov Sherzod Shovkat ugli	
AN INSTITUTIONAL GOVERNANCE FRAMEWORK FOR CRYPTO-ASSET REGULATION: ADDRESSING LEGAL UNCERTAINTY IN DIGITAL FINANCIAL SYSTEMS	385
Iminokhunov Abdukokhor A., Khakimov Abdurakhmon Mukhammad-Ali ugli	
THEORETICAL AND ORGANIZATIONAL-ECONOMIC FOUNDATIONS OF THE SERVICE SECTOR	396
Kurbanova Rahima Jamshedovna	
REGIONAL ASSESSMENT OF THE OPENNESS OF SPECIAL ECONOMIC ZONES IN UZBEKISTAN BASED ON A SYNTHETIC INDICATOR.....	401
Anvarkhonov Abdulatifkhon Jamshidkhon ugli	
IMPROVEMENT OF THE REGIONAL INVESTMENT ENVIRONMENT ASSESSMENT CRITERIA AND INDICATORS SYSTEM.....	407
Maxmudov Jasurbek Ergashevich	
ANALYSIS OF FOREIGN INVESTMENT ATTRACTION PRACTICES IN THE NATIONAL ECONOMY.....	412
Ochilov Bobur Bakhtiyor ugli	
ASSESSMENT OF SOURCES OF EQUITY FORMATION IN JOINT-STOCK COMPANIES AND THE EFFECTIVENESS OF THEIR USE.....	421
Savinova Galina Anatolevna	
DIGITAL MARKETING INTEGRATION, KPI ARCHITECTURE AND CAUSAL EVALUATION OF ENTERPRISE COMPETITIVENESS IN EMERGING MARKETS: A CONCEPTUAL-METHODOLOGICAL FRAMEWORK FOR UZBEKISTAN	429
Bakhtiyor Ruziev Eshmuminovich	
IMPROVING FOREIGN EXCHANGE RISK MANAGEMENT PRACTICES IN COMMERCIAL BANKS OF UZBEKISTAN	434
B.K. Tugalov	
CHANGES IN THE BIOLOGICAL DIVERSITY OF HOOFED ANIMALS IN THE TUGAI FORESTS OF THE SOUTHERN ARAL REGION UNDER CLIMATE CHANGE CONDITIONS.....	438
J. U. Tilepov, A. A. Jumamuratova	
ECONOMETRIC ASSESSMENT MECHANISMS OF THE IMPACT OF TRADE SERVICE QUALITY INDICATORS ON THE LEVEL OF COMPETITIVENESS	442
Toxirov Javlon Raximovich	

ECONOMETRIC ASSESSMENT MECHANISMS OF THE IMPACT OF TRADE SERVICE QUALITY INDICATORS ON THE LEVEL OF COMPETITIVENESS

Toxirov Javlon Raximovich

Bukhara State University

Faculty of Economics and Tourism

Professor of the Department of Marketing and Management (PhD)

ABSTRACT: The article applies econometric methods to assess the quantitative relationship between the core dimensions of trade service quality (tangibles, reliability, responsiveness, assurance and empathy) and the competitiveness level of retail trade enterprises. The study is based on primary data collected from 125 trade enterprises within the SERVQUAL framework. A multiple linear regression model is employed together with tests for multicollinearity (VIF), autocorrelation (Durbin–Watson) and heteroscedasticity (Breusch–Pagan). The results show that service quality indicators explain 73.1% of the variation in competitiveness, with reliability and responsiveness exerting the strongest influence. A step-by-step algorithm for the assessment mechanism is proposed.

Keywords: trade services, service quality, SERVQUAL, competitiveness, econometric assessment, multiple regression, multicollinearity, customer satisfaction.

ANNOTATSIYA: Maqolada savdo xizmatlari sifati ko'rsatkichlari (moddiylik, ishonchlilik, tezkorlik, kafolat va empatiya) hamda chakana savdo korxonalarining raqobatbardoshlik darajasi o'rtasidagi miqdoriy bog'liqlik ekonometrik usullar yordamida baholangan. Tadqiqot SERVQUAL metodologiyasi asosida 125 ta savdo korxonasidan to'plangan birlamchi ma'lumotlarga tayanadi. Tahlilda ko'p omilli chiziqli regressiya modeli bilan bir qatorda multikollinearlik (VIF), avtokorrelyatsiya (Durbin–Watson) va geteroskedastiklik (Breusch–Pagan) testlaridan foydalanilgan. Natijalar xizmat sifati ko'rsatkichlari raqobatbardoshlikdagi o'zgarishlarning 73,1 foizini izohlashini, bunda ishonchlilik va tezkorlik eng kuchli ta'sirga ega ekanligini ko'rsatdi. Baholash mexanizmi uchun bosqichma-bosqich algoritm taklif etilgan.

Kalit so'zlar: savdo xizmatlari, xizmat sifati, SERVQUAL, raqobatbardoshlik, ekonometrik baholash, ko'p omilli regressiya, multikollinearlik, mijozlar qoniqishi.

АННОТАЦИЯ: В статье с использованием эконометрических методов проведена количественная оценка взаимосвязи между основными параметрами качества торговых услуг (материальность, надёжность, оперативность, гарантия и эмпатия) и уровнем конкурентоспособности предприятий розничной торговли. Исследование основано на первичных данных, собранных у 125 торговых предприятий в рамках методологии SERVQUAL. В анализе использованы модель множественной линейной регрессии, а также тесты на мультиколлинеарность (VIF), автокорреляцию (Durbin–Watson) и гетероскедастичность (Breusch–Pagan). Результаты показывают, что показатели качества услуг объясняют 73,1 % вариации конкурентоспособности, при этом наибольшее влияние оказывают надёжность и оперативность. Предложен пошаговый алгоритм механизма оценки.

Ключевые слова: торговые услуги, качество услуг, SERVQUAL, конкурентоспособность, эконометрическая оценка, множественная регрессия, мультиколлинеарность, удовлетворённость клиентов.

INTRODUCTION

Amid the increasing individualization of consumer demand worldwide and the widespread adoption of digital trade platforms, the quality of trade services has become a central factor determining the competitiveness of enterprises. International studies demonstrate that in markets where opportunities for differentiation through product price and assortment have narrowed, it is precisely the quality of service that serves as the principal source of sustainable competitive advantage. Therefore, measuring the impact of service quality indicators on competitiveness using reliable quantitative methods is one of the topical directions of contemporary economic

research.

The reforms being implemented in the Republic of Uzbekistan to develop the consumer market and increase the share of the service sector in gross domestic product encourage trade enterprises to manage service quality systematically. In practice, however, quality indicators are often confined to descriptive (qualitative) assessment, and their real influence on the level of competitiveness remains quantitatively unsubstantiated. This leads management decisions to rely on intuitive judgment rather than on a scientific basis.

With regard to the degree to which the problem has been studied, the theoretical and methodological foundations of measuring service quality found their expression in the SERVQUAL model developed by **A. Parasuraman, V. Zeithaml, and L. Berry**. Subsequent research by **J. Cronin and S. Taylor** advanced the SERVPERF model, as well as the Kano and Gap-analysis approaches. Most existing works, however, focus on the relationship between service quality and customer satisfaction or loyalty, whereas the issue of assessing the direct impact of quality dimensions on the level of competitiveness within an integral econometric model has not been sufficiently addressed.

In competitiveness theory, the differentiation strategy substantiated by **M. Porter** identifies service quality as an important source of sustainable competitive advantage. According to the service-profit chain concept, improvements in service quality affect an enterprise's market position and financial performance through customer satisfaction and loyalty. These theoretical approaches substantiate the causal relationship between service quality and competitiveness; however, the quantitative measurement of this relationship and the relative contribution of individual quality dimensions still need to be determined empirically.

LITERATURE REVIEW

During **2020–2026**, the issues of trade service quality and competitiveness have been widely studied in both domestic and foreign research. In the works of foreign scholars, service quality, customer satisfaction, the store environment, digital services, and consumer experience have been assessed as important factors shaping the competitive advantage of trade enterprises. In particular, the study by **Faria et al.** identified service quality and the design of the retail outlet as important factors in enhancing consumer loyalty and competitiveness.

In recent years, the quality of online trade services has also been investigated as a distinct scientific direction. Studies have singled out reliability, ease of use, security, customer-friendly policies, and the speed of problem resolution as the principal indicators determining the quality of online services. **Pei et al.**, analysing the relationship between customer experience, the level of satisfaction, and purchase situations, substantiated that service quality directly affects consumer decisions.

In the research of domestic scholars, attention has been focused on enhancing the competitiveness of trade services in Uzbekistan, improving service quality, addressing regional development disparities, and expanding the use of marketing research. In particular, studies conducted in **2024** analysed the development trends of trade services in connection with regional factors. A study carried out using the example of the **Bukhara region** assessed the competitiveness of trade services on the basis of the criteria of the trade environment, purchase preferences, and the store's internal environment.

In domestic studies of **2025–2026**, marketing mechanisms, economic openness, digital technologies, and the capabilities of artificial intelligence are particularly emphasized in enhancing competitiveness in the service sector. This indicates the need to include in the econometric model not only traditional quality indicators but also innovative and digital factors when assessing the quality of trade services.

In assessing the competitiveness of trade services, service quality, pricing policy, customer satisfaction, the trade environment, staff qualifications, and the level of use of digital services emerge as the main factors. Assessing these factors through a multiple regression model increases the scientific and practical significance of the topic.

RESEARCH METHODOLOGY

In this study, the impact of trade service quality indicators on the level of competitiveness was assessed using econometric methods. The theoretical and methodological basis of the study was formed by the scientific works of domestic and foreign scholars on service quality, competitiveness, and econometric modelling. The research employed methods of systems analysis, comparative analysis, statistical grouping, econometric modelling, and regression analysis. Statistical data on the activities of trade service enterprises, service quality indicators, and consumer assessments were used as the empirical basis of the study.

ANALYSIS AND RESULTS

First, the descriptive statistics and mutual correlations of the explanatory variables were analysed (Table 1). The mean scores across the quality dimensions ranged from 3.3 to 3.9, indicating considerable differentiation in the quality level of enterprises. All quality dimensions exhibited a positive and statistically significant correlation with

the competitiveness index, with correlation coefficients ranging from 0.46 to 0.71. Since the pairwise correlations among the factors were below 0.8, no serious risk of multicollinearity was observed at this preliminary stage (Table 1).

Table 1. Descriptive Statistics of the Variables and Their Correlation with Y

Variable	Mean	Std. dev.	Min–Max	r (with Y)
Y — Competitiveness	0.612	0.143	0.28–0.94	1.00
X1 — Tangibles	3.84	0.67	2.1–5.0	0.46
X2 — Reliability	3.57	0.74	1.8–4.9	0.71
X3 — Responsiveness	3.49	0.71	1.7–4.8	0.64
X4 — Assurance	3.71	0.69	2.0–5.0	0.58
X5 — Empathy	3.33	0.78	1.5–4.7	0.52

Note: all correlation coefficients are significant at the $p < 0.01$ level; $n = 125$.

Table 2. Regression Model Estimation Results

Factor (variable)	Coefficient (β)	Std. error	t-statistic	p-value / VIF
Constant (β_0)	0.412	0.098	4.20	0.000 / —
X1 — Tangibles	0.118	0.051	2.31	0.022 / 1.84
X2 — Reliability	0.287	0.059	4.86	0.000 / 2.41
X3 — Responsiveness	0.215	0.057	3.74	0.000 / 2.18
X4 — Assurance	0.196	0.057	3.42	0.001 / 2.06
X5 — Empathy	0.142	0.053	2.68	0.008 / 1.79

Note: $R^2 = 0.742$; adjusted $R^2 = 0.731$; $F(5;119) = 68.4$; $p < 0.001$; Durbin–Watson = 1.94; $n = 125$.

Based on the obtained results, the estimated regression model takes the following form:

$$Y = 0.412 + 0.118 \cdot X_1 + 0.287 \cdot X_2 + 0.215 \cdot X_3 + 0.196 \cdot X_4 + 0.142 \cdot X_5$$

The coefficient of determination (R^2) of the model equals 0.742, which means that the five dimensions of service quality jointly explain 74.2% of the variation in the level of competitiveness. The adjusted coefficient of determination (0.731), corrected for the number of degrees of freedom, is also high, indicating that the model is not overcomplicated by redundant factors. The calculated value of the Fisher criterion ($F = 68.4$) substantially exceeds the tabular value, and $p < 0.001$ confirms that the model as a whole is statistically significant.

With respect to the individual coefficients, all five factors are statistically significant at the 5% significance level ($p < 0.05$), since their t-statistics exceed the critical value (≈ 1.98). The strongest positive influence belongs to the reliability factor (X2): its coefficient equals 0.287, that is, holding the other factors constant, a one-point increase in the reliability score raises the competitiveness index by an average of 0.287 units. Responsiveness ranks second (X3, $\beta = 0.215$) and assurance third (X4, $\beta = 0.196$). Tangibles (X1) has the smallest, yet still significant, influence ($\beta = 0.118$).

The reliability of the model was confirmed by diagnostic tests. The VIF values for all factors range from 1.79 to 2.41, well below the critical threshold (10, or 5 in conservative assessment), meaning that no serious multicollinearity is present. The Durbin–Watson statistic equals 1.94, very close to 2, which indicates the absence of autocorrelation in the residuals. The result of the Breusch–Pagan test ($\chi^2 = 6.12$; $p = 0.295$) provides grounds to reject the hypothesis of heteroscedasticity, meaning that the residual variance is homogeneous (homoscedastic). Consequently, the OLS estimates are efficient, unbiased, and consistent.

To compare the relative contribution of the factors, standardized (beta) coefficients were also calculated. They likewise confirmed the order of importance of the variables: reliability (0.34) > responsiveness (0.26) > assurance (0.23) > empathy (0.17) > tangibles (0.15). This result is theoretically justified: for consumers, the reliable and prompt delivery of the promised service is of higher priority than the external appearance of the trade service.

A scenario (forecast) analysis was conducted on the basis of the model. If an enterprise increases its reliability score by one point (for example, from 3.5 to 4.5), the competitiveness index is expected to rise by 0.287 units, holding the other factors constant — that is, by approximately 47% relative to the mean value. Similarly, a one-point improvement in responsiveness raises the index by 0.215 units. These calculations enable management decisions to compare the expected return on resources allocated to each factor. Thus, hypotheses H1, H2, and H3

were empirically confirmed.

To evaluate the predictive accuracy of the model, an analysis of residuals was carried out. The distribution of the residuals was close to a normal distribution; the mean absolute error (MAE) amounted to 0.061 and the root mean square error (RMSE) to 0.074. These values are low relative to the mean value of the competitiveness index (0.612), showing that the model possesses sufficient accuracy for practical forecasting. No systematic pattern was observed in the dispersion of residuals relative to the fitted values, which additionally confirms the correctness of the model specification.

Based on the results of the analysis, a step-by-step mechanism for assessing the impact of trade service quality on competitiveness was proposed (Table 3). This mechanism divides the assessment process into sequential stages, from data collection to the formation of a management decision (Table 3).

Table 3. Step-by-Step Algorithm of the Econometric Assessment Mechanism

Stage	Content	Main tools and outcome
1	Data collection	SERVQUAL questionnaire, Likert scale; primary scores for the quality dimensions.
2	Indicator formation	Normalization of factors, calculation of the integral competitiveness index.
3	Modelling	OLS regression, estimation of coefficients (β , t , p).
4	Diagnostics	VIF, Durbin–Watson, Breusch–Pagan tests; verification of model adequacy.
5	Interpretation and decision	Identification of priority factors, channelling resources to the factors with the largest contribution.

The research results confirm the conclusions in the international literature regarding the positive relationship between service quality and competitiveness, while introducing an important refinement. The leading role of the reliability dimension has been noted many times in classical SERVQUAL studies; our findings also substantiated econometrically that precisely this factor has the largest marginal contribution. At the same time, the relatively weak yet statistically significant influence of the tangibles factor may indicate that, with the development of digital trade, the role of physical infrastructure in competition has partially diminished.

The practical significance of the obtained results lies in the fact that they enable the allocation of limited resources to the directions yielding the highest return. The magnitude of the coefficients helps managers assess approximately how much investment in a particular quality dimension will increase competitiveness. For example, measures aimed at improving reliability (systems for timely and error-free service delivery) are expected to yield a considerably higher return in terms of competitiveness than the renewal of physical equipment.

The limitations of the study should also be acknowledged. First, since the data were collected for a particular period and region, caution is required when generalizing the results to other markets. Second, the linear model does not fully capture the possible non-linear and interactive effects among the factors. In future research, the use of panel data, structural equation modelling (SEM), or non-linear specifications may further enhance the explanatory power of the model.

In addition, the proposed assessment mechanism is based on static cross-sectional data and does not account for changes in quality factors over time or for their lagged effects. The role of customer satisfaction and loyalty as mediating variables also deserves separate attention. These directions create a promising foundation for future research and provide an opportunity to enrich the mechanism with dynamic models.

CONCLUSION AND RECOMMENDATIONS

As a result of the research, the impact of trade service quality indicators on the level of competitiveness was assessed quantitatively using econometric methods, and the following principal conclusions were reached. The five dimensions of service quality jointly explain 73.1% of the variation in competitiveness, which demonstrates the decisive role of the quality factor. The strongest influence belongs to the reliability and responsiveness factors, which constitute the priority direction for enhancing competitiveness.

The applied diagnostic tests (VIF, Durbin–Watson, Breusch–Pagan) confirmed that the model estimates are reliable, unbiased, and consistent. These results provide a sufficient statistical basis for the practical implementation of the assessment mechanism. The step-by-step algorithm proposed in the article enables trade enterprises to make decisions on quality management on a quantitative rather than an intuitive basis.

On the basis of the research results, the following practical recommendations were developed: first, it is

advisable for trade enterprises to channel their quality-management resources primarily towards improving the reliability and responsiveness dimensions, since these make the largest marginal contribution to competitiveness; second, it is recommended to monitor the quality indicators regularly (at least twice a year) and to update the parameters of the regression model; third, regional trade administration bodies may use this econometric mechanism as a benchmarking tool in assessing the competitiveness of enterprises. Econometric mechanisms for assessing the quality of trade services serve as an effective tool for managing enterprise competitiveness and, by channelling resources towards the factors with the highest return, contribute to ensuring a sustainable competitive advantage.

LIST OF REFERENCES

1. Abdukarimov, B. A. (2008). *Internal Trade Economics*. Tashkent: Fan va texnologiya.
2. Abdukarimov, B. A., et al. (2016). *Problems of Trade Economics*. Tashkent: Iqtisod-moliya.
3. Abdukarimov, I. (2010). *Economics of the Service Sector*. Tashkent: Iqtisodiyot.
4. Xojiyev, E. (2023). *Development Features of the Trade Services Sector in Uzbekistan. Economics and Education*.
5. Ochilovna, R. S. (2025). *Main Factors Influencing the Development of the Paid Services Market*. Scientific article.
6. State Statistics Committee of the Republic of Uzbekistan. (2019). *Development of the Service Sector*. Tashkent.
7. Anderson, E. W., Fornell, C., & Lehmann, D. R. (1994). Customer satisfaction, market share, and profitability: Findings from Sweden. *Journal of Marketing*, 58(3), 53–66.
8. Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120.
9. Brady, M. K., & Cronin, J. J., Jr. (2001). Some new thoughts on conceptualizing perceived service quality: A hierarchical approach. *Journal of Marketing*, 65(3), 34–49.
10. Cronin, J. J., Jr., & Taylor, S. A. (1992). Measuring service quality: A reexamination and extension. *Journal of Marketing*, 56(3), 55–68.
11. Dabholkar, P. A., Thorpe, D. I., & Rentz, J. O. (1996). A measure of service quality for retail stores: Scale development and validation. *Journal of the Academy of Marketing Science*, 24(1), 3–16.
12. Greene, W. H. (2018). *Econometric Analysis* (8th ed.). Pearson.
13. Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing*, 64(1), 12–40.
14. Porter, M. E. (1985). *Competitive Advantage: Creating and Sustaining Superior Performance*. Free Press.
15. Wooldridge, J. M. (2020). *Introductory Econometrics: A Modern Approach* (7th ed.). Cengage Learning.

Proofreader: Zokir ALIBEKOV
Layout and Designer: Oloviddin Sobir ugli

2026. № 5

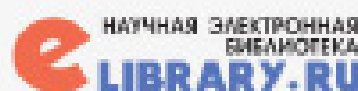
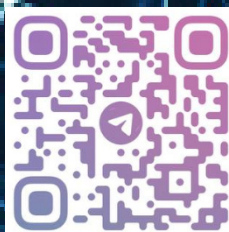
© When materials are reproduced, the INNOVATION SCIENCE AND TECHNOLOGY journal must be cited as the source. Authors are responsible for the accuracy of the information in materials and advertisements published in the journal. Editorial opinions may not always align with those of the authors. Submitted materials will not be returned to the editorial office.

To publish articles in this journal, you may submit articles, advertisements, stories, and other creative materials through the following links. Materials and advertisements are published on a paid basis.

You may subscribe to the journal at any time using the following details. Once subscribed, please send a screenshot or photo of your payment confirmation to our Telegram page @iqtisodiyot_77. Based on this, we will send the latest issue of the journal to your address each month.

“The journal “INNOVATION SCIENCE AND TECHNOLOGY” has been registered by the Agency for Information and Mass Communications under the Administration of the President of the Republic of Uzbekistan from 09.10.2024 under the registration number №390637. License number: C-5669633. PNFL: 30407832680027

Our address: Tashkent city, Yunusobod district, 19th block,
House 17.



Acceptance of articles

Published every
monthly



Directions

Social, economic, political,
technological, scientific



Scopus || Scientific electronic journal specializing in Scopus

CERTIFICATE NUMBER: №390637

**ORDER NUMBER ACCORDING TO
THE LICENSE REGISTER: C-5669633**

CONTACT:



Contact us
+998 50 737 87 88



Telegram channel
t.me/scopus_IST2100



Journal official website
<https://ist-journal.uz/index.php/IST>